



## MIR145 gene

microRNA 145

### Normal Function

The *MIR145* gene provides instructions for making microRNA-145 (miR-145). MicroRNAs (miRNAs) are short lengths of RNA, a chemical cousin of DNA. These molecules control gene expression by blocking the process of protein production. MiR-145 is abundant in immature blood cells and controls the expression of hundreds of genes. This microRNA is thought to be involved in normal blood cell development. In particular, miR-145 appears to play a role in the growth and division of blood cells called megakaryocytes, which produce platelets, the cell fragments involved in blood clotting.

### Health Conditions Related to Genetic Changes

#### 5q minus syndrome

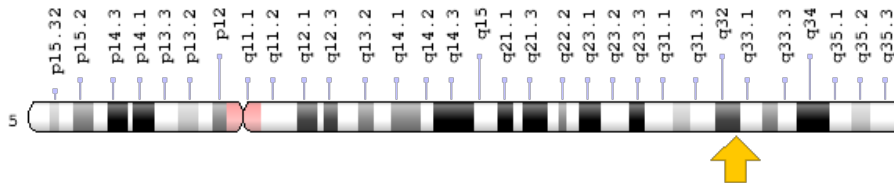
The *MIR145* gene is involved in a condition called 5q minus (5q-) syndrome. This condition is a type of bone marrow disorder called myelodysplastic syndrome (MDS), in which immature blood cells fail to develop normally. Individuals with 5q- syndrome often have a shortage of red blood cells (anemia) and abnormalities in megakaryocytes. Affected individuals also have an increased risk of developing a fast-growing blood cancer known as acute myeloid leukemia (AML).

5q- syndrome is caused by deletion of a region of DNA from the long (q) arm of chromosome 5. This deletion occurs in immature blood cells during a person's lifetime and affects one copy of chromosome 5 in each cell. Most people with 5q- syndrome are missing a sequence of about 1.5 million DNA building blocks (base pairs), also written as 1.5 megabases (Mb). This deleted region contains 40 genes, including *MIR145*. Loss of one copy of the *MIR145* gene reduces the amount of the microRNA miR-145 in cells. As a result, levels of proteins whose production is normally blocked by miR-145 are elevated, which leads to the abnormal development of megakaryocytes that occurs in 5q- syndrome. Research suggests that the other features of the condition are associated with other genes in the deleted segment of DNA.

## Chromosomal Location

Cytogenetic Location: 5q32, which is the long (q) arm of chromosome 5 at position 32

Molecular Location: base pairs 149,430,646 to 149,430,733 on chromosome 5 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

## Other Names for This Gene

- hsa-mir-145
- miR-145
- MIRN145
- miRNA145

## Additional Information & Resources

### Educational Resources

- Stembook (2008): MicroRNA Biogenesis and Function  
<https://www.ncbi.nlm.nih.gov/books/NBK27061/#theroleofmicrornasingermline.sec1-3>

### Scientific Articles on PubMed

- PubMed  
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28MIR145%5BTIAB%5D%29+OR+%28microRNA+145%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1080+days%22%5Bdp%5D>

### OMIM

- MICRO RNA 145  
<http://omim.org/entry/611795>

## Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology  
<http://atlasgeneticsoncology.org/Genes/MIR145ID50927ch5q32.html>
- HGNC Gene Family: MicroRNAs  
<http://www.genenames.org/cgi-bin/genefamilies/set/476>
- HGNC Gene Symbol Report  
[http://www.genenames.org/cgi-bin/gene\\_symbol\\_report?q=data/hgnc\\_data.php&hgnc\\_id=31532](http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=31532)
- NCBI Gene  
<https://www.ncbi.nlm.nih.gov/gene/406937>

## **Sources for This Summary**

- Giagounidis A, Mufti GJ, Fenaux P, Germing U, List A, MacBeth KJ. Lenalidomide as a disease-modifying agent in patients with del(5q) myelodysplastic syndromes: linking mechanism of action to clinical outcomes. *Ann Hematol*. 2014 Jan;93(1):1-11. doi: 10.1007/s00277-013-1863-5. Epub 2013 Sep 10. Review.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/24018623>  
*Free article on PubMed Central:* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3889654/>
- Komrokji RS, Padron E, Ebert BL, List AF. Deletion 5q MDS: molecular and therapeutic implications. *Best Pract Res Clin Haematol*. 2013 Dec;26(4):365-75. doi: 10.1016/j.beha.2013.10.013. Epub 2013 Oct 16. Review.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/24507813>
- Kumar MS, Narla A, Nonami A, Mullally A, Dimitrova N, Ball B, McAuley JR, Poveromo L, Kutok JL, Galili N, Raza A, Attar E, Gilliland DG, Jacks T, Ebert BL. Coordinate loss of a microRNA and protein-coding gene cooperate in the pathogenesis of 5q- syndrome. *Blood*. 2011 Oct 27;118(17):4666-73. doi: 10.1182/blood-2010-12-324715. Epub 2011 Aug 26.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/21873545>  
*Free article on PubMed Central:* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3208282/>
- OMIM: MICRO RNA 145  
<http://omim.org/entry/611795>
- Starczynowski DT, Kuchenbauer F, Argiropoulos B, Sung S, Morin R, Muranyi A, Hirst M, Hogge D, Marra M, Wells RA, Buckstein R, Lam W, Humphries RK, Karsan A. Identification of miR-145 and miR-146a as mediators of the 5q- syndrome phenotype. *Nat Med*. 2010 Jan;16(1):49-58. doi: 10.1038/nm.2054. Epub 2009 Nov 8.  
*Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/19898489>

---

Reprinted from Genetics Home Reference:

<https://ghr.nlm.nih.gov/gene/MIR145>

Reviewed: November 2015

Published: March 21, 2017

Lister Hill National Center for Biomedical Communications  
U.S. National Library of Medicine  
National Institutes of Health  
Department of Health & Human Services